Hobbies WEEKLY

CONTENTS

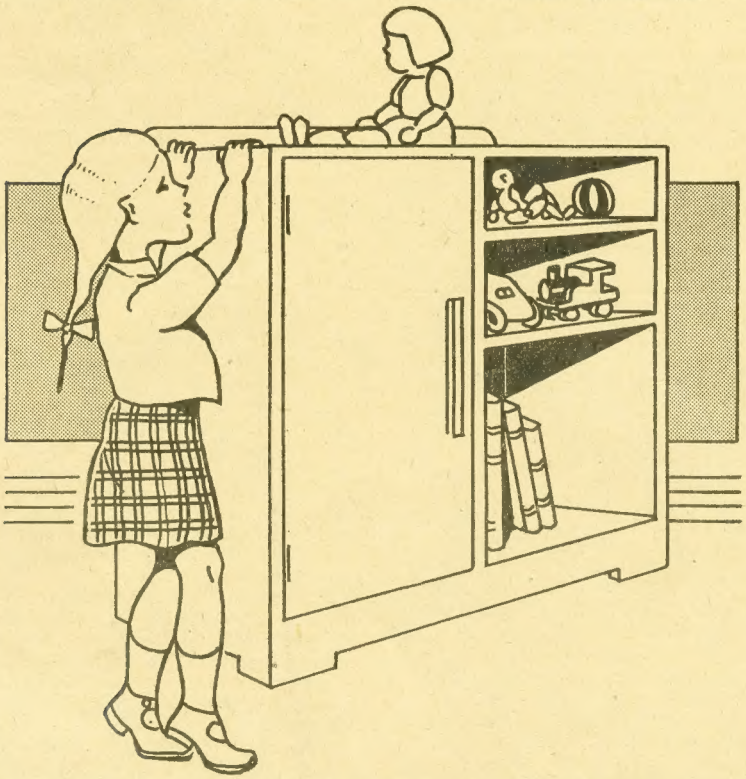
January 19th, 1949 Price Threepence Vol. 107 No. 2777

A CABINET FOR TOYS

IN most homes, children's toys are usually lying around in a careless manner, so why not a special cabinet for the toys? The owners of the toys could be taught to put the playthings neatly away after tiring of playing with them. It will teach tidiness.

The toys and novelties for which the cabinet is designed is the usual small things, such as motors, trains, dolls, bears, alphabetical blocks, etc. There is also space for children's bedtime story books. The cabinet is particularly useful in a nursery, and it may be constructed in the solid, or as a framework, according to the material available.

As the cabinet is enamelled egg-shell blue or light green, almost any sort of wood can be used. Open grain stuff like oak should b e avoided as this, unless well filled, is apt to show up with the closer-grained timbers you may use. Deal shelving boards could be used throughout the construction, if you have this material in hand, or can pick up sufficient for your requirements second-hand at a timber yard.



The Ends

The ends of the cabinet are prepared first. If you have $\frac{7}{8}$in. thick deal boards, it will be necessary to make these up to 12ins. wide by rub-jointing on an extra strip. The joints are later trimmed with a smoothing plane, then the ends cut square to size, and the feet shaped.

Less timber is required if you make a frame from 2in. by $\frac{7}{8}$in. wood, as in the end elevation. The parts are dowelled together. However, have all the dowel holes bored first, then plough a groove $\frac{1}{4}$in. wide by $\frac{1}{4}$in. deep in all the edges. Stumps of dowel (use $\frac{3}{8}$in. dowelling) are glued into the ends of the cross pieces, and the tips pared with a chisel to facilitate entry.

Large Panels

Now, you need two panels of wood about 30ins. long by 8$\frac{1}{2}$ins. wide by $\frac{1}{4}$in. thick. A 30in. length of 1in. thick shelving, of the width necessary, will make two panels, and is parted with a circular saw. The 1in. thick stuff will be unplaned, but after the sawing, one side will be planed. All this work

will have to be done at a saw mill, or wood machinists' workshop.

Prepare the panels to size, then assemble them in their separate framings. Incidentally, when selecting the board for the panels, pick a piece free from large ugly knots, as these will likely drop out or give a lot of trouble.

The Top and Bottom Boards

The top and bottom boards will have to be solid wood $\frac{7}{8}$in. thick. The top is exactly 36ins. long by 12ins. wide. The bottom is $1\frac{3}{4}$ins. shorter to allow for the thickness of the ends. Fix the top flush on the ends, then attend to the bottom. Use glue and 2in. oval nails. Drive the nails in at a slight slant to "dovetail" them.

It will be necessary to mark guide lines for the ends of the bottom on the interior of the gables. Use a large try-square, and note that the bottom is $3\frac{7}{8}$ins. upwards from the toes of the gables. The position is 3ins. up if you disregard the thickness of the bottom board.

You need a central division board, which could be a frame. This is exactly $28\frac{1}{4}$ins. long, and care should be taken to have the edges the right length, and trimmed square. The shelves are $\frac{7}{8}$in. thick. These are added after the central board has been affixed in place.

Complete the carcase by fitting a bottom front skirting piece to the work, then a narrow pediment to the top, flush at the back. See that the carcase is quite square, then add a backing. This can be old lino or smooth roofing felt. Run the joint up the centre of the central divisional board.

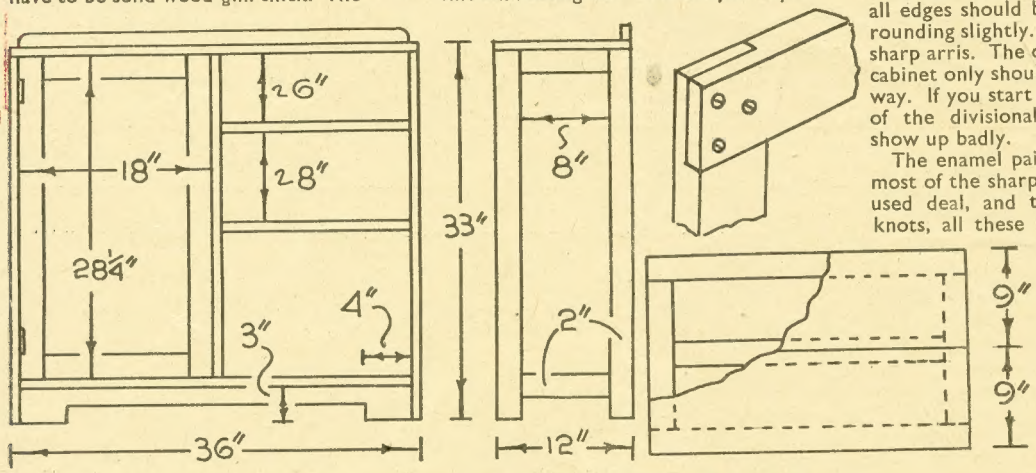


Fig. 1—Front and end elevations with detail of door and corner joint

The Door

The door cannot be made in the solid, unless flush battening is fitted at the ends to prevent bending. A framed door could be made and fitted, as in Fig. 1, but if you have made do without framings, a "solid" door effect can be easily obtained by making up a frame from 2in. by $\frac{7}{8}$in. stuff, the ends being half-lapped, glued and screwed together. A detail of this frame is shown.

It is only necessary to cover the screw-head side with 9in. wide by $\frac{1}{4}$in. pieces of deal (obtained in the same way already described for the end framings). The door is made a flush fit, being hung on two 2in. butt hinges and fitted with a ball catch and handle.

A loose shelf, $\frac{1}{2}$in. thick, plus 1in. less than 12ins., must be fitted inside the compartment. In fact, a couple of these shelves could be provided. The shelves rest on narrow fillets of wood screwed in place.

Being a piece of nursery furniture, all edges should be made smooth by rounding slightly. Simply remove the sharp arris. The outside edges of the cabinet only should be treated in this way. If you start rounding the edges of the divisional parts, these will show up badly.

The enamel paint helps to smooth most of the sharp edges. If you have used deal, and there are countless knots, all these need to be daubed with a thin french polish. When dry, the surplus polish is scraped away and the surface of the wood smoothly glasspapered. A thin coat of flat paint is applied.

This, when dry, is smoothed down, then the first coat of enamel flowed on, using a proper enamel brush. Two coats of enamel should suffice, or possibly the single coat, in view of the foundation coat of paint.

As to the finishing colour, egg-shell blue or very light green has been mentioned, although the cabinet can be enamelled to match its surroundings. Whilst the cabinet is meant as a holder for playthings, it has many other domestic uses, and would serve a useful purpose in almost any home.

Because it is a piece of furniture it must be strong and rigid enough to withstand moving about, and even being used as a seat.

Valve Tester—(*Continued from page* 191)

has a base which will not fit the holder. The clips are connected directly to the valve pins, taking great care to avoid short-circuits. Pin connections are shown in Fig. 3. The three top bases will fit the holder in the tester.

Base 1

This is used with detectors such as Osram HL2 and HL2/K; Cossor 210HF; Mazda HL2; Micromesh HLB1, Mullard PM1HL and PM2HL, and Ever-Ready K30C. Also with L.F. amplifiers such as Osram L210, Cossor 210LF, Mazda L210, and Mullard PM1LF.

Small power valves such as Osram LP2, Cossor 220PA, Mazda P220 and Mullard PM2A, use this base. Also power valves such as Osram P2, Cossor 220P, Mazda P220A, and Mullard PM202.

Base 2

This is used by output pentodes such as Osram PT2, Cossor 220PT and 220HPT; Mazda PEN220 and Mullard PM22A.

Bases 3 and 4

The same valves are made with the 4-pin and 7-pin base (with a top cap in each case). They are high frequency valves such as Cossor 210VPT, 210VPA, and 210SPT, Mazda SP210 and VP210, Osram VP21 and Z21, Mullard VP2 and SP2, and Tungsram PH211c and HP210c.

Base 5

This is used by the Mazda HL23 detector, and the same type produced by other manufacturers, developed during the last few years.

Base 6

This is used with the new H.F. valves such as the Mazda SP22, VP22 and VP23. Note the top cap is the grid, not the anode, as with the previous valves.

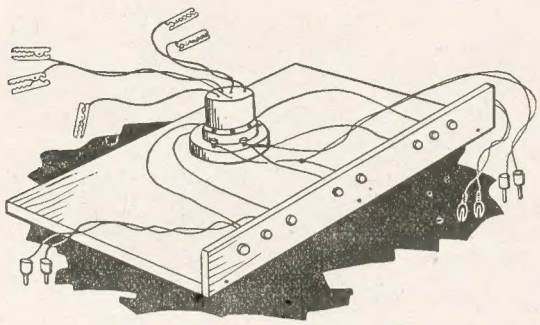
The pins marked "MET" are connected to the metal screening coating of the valves and can be ignored during tests, as can any blank pins.

"SUP" indicates the Suppressor Grid pin. This should be connected to one filament with a short piece of wire. In the 4-pin valves it is thus connected internally.

When testing shows a valve is useless, it is worth while making sure there is not some simple fault which can be rectified. Make certain the filament and other pins are clean, and opened out sufficiently to contact the holder sockets.

Also see that the thin wire has not become unsoldered or broken inside the valve-legs. If it has, applying flux and solder will remedy the trouble.

How the amateur radio enthusiast can build a SIMPLE VALVE TESTER



UNLESS the proper way is known it is almost impossible to test valves. The radio engineer uses a tester which may have twenty or more valveholders and two or three meters. But such an elaborate piece of equipment is not required for the most popular valves, and there is no point in incorporating valveholders suitable for valve types which the constructor may never use.

Accordingly, the tester described here has a single holder which takes all the common battery operated valves. So that other types can be tested, if necessary, an adaptor is used. The clips attached to this can then be put straight on the valve pins, when the valve will not fit the holder provided. Therefore a valve with any type of base can be tested.

Constructional details

Construction is simple so only very brief details will be given. All the connections are shown in Fig. 1, which illustrates a 5-pin valveholder screwed down on a wooden base 5ins. by 3ins. A strip of insulating material 1½ins. by 5ins. is screwed to the front edge of the base. This strip carries eight terminals or sockets, the latter being most convenient.

The strip should be marked out as shown, so that no error is likely to arise in testing. For the various battery leads, 2ft. lengths of flex can be used.

The Adaptor

This is made by removing the glass envelope from a broken valve (probably obtainable for a few pence from a local radio service shop, if not already to hand). Unsolder the thin wires and solder on five 1ft. lengths of insulated flex, passing the bared ends down through the hollow pins. The flex should be coloured, or tabs attached to show connections (see Fig. 2).

A small crocodile clip is attached to the end of each lead. To hold the leads secure, the valve base can be filled with melted pitch, or some similar compound.

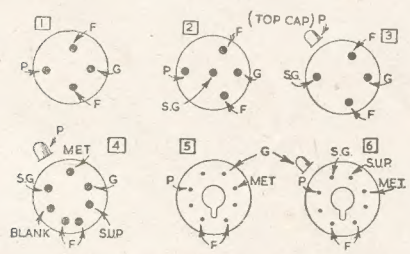


Fig. 3—Valve pin connections

The Test Meter

A meter which reads volts and milliamps is necessary for use with the valve tester, and good ex-service ones can be obtained for a few shillings. Filament continuity can be tested with headphones, but for a true indication of the condition of the valve, a meter is essential.

Filament Test

For this, connect a 2-volt accumulator to the leads marked "Filament Supply". Connect the meter to the sockets marked "F". When the valve to be tested is inserted in the valveholder the meter should show 2 volts, if set to measure volts. If set to measure current, it will indicate the filament current. This is from .05 to .1 amp for detectors, and .2 to .3 amp for output valves and H.F. valves.

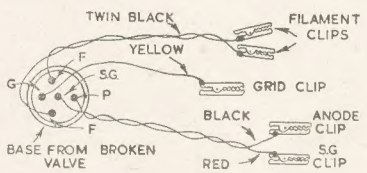


Fig. 2—The valve adaptor

If no indication is obtained, the filament is burnt out and the valve is useless. To make certain the supply is in order, it is usual to measure the voltage at the sockets "F.V." If the filament is intact, the valve is all right provided the emission has not fallen.

Testing Emission

The term "emission" refers to the current passing between filament and the other electrodes. With old valves, or valves which have been misused, the emission may cease although the filament is intact.

Detector valves (see list) should have a plate current of from ¾ to 1½ milliamps, with about 60 volts high tension. The exact figure for any particular valve will be found from the manufacturer's data. To test this, insert the valve and short sockets "F" with a short length of wire fitted with two plugs. Similarly short the G.B. sockets. Now connect the meter to the sockets "A" and apply the H.T. voltage from a battery. The meter should then show a current as mentioned. If so, the valve is in good order.

Output Valves

These require grid bias, so remove the shorting wire and connect a G.B. battery. Use 120 volts H.T. and 4.5 volts G.B. The anode current for low-frequency amplifying valves will then be about 2 to 3 milliamps. Small power valves will pass 4 to 7 milliamps approximately, and power valves 10 to 12 milliamps. If the valve is out of order, current will be less than these figures. If more than about 50 per cent less, the valve is worn out.

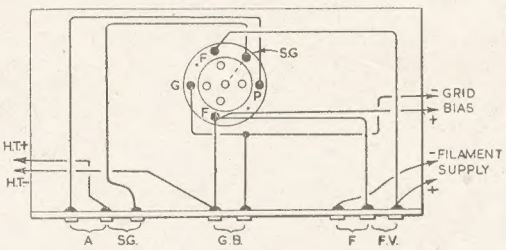


Fig. 1—Wiring diagram of the tester

Pentodes pass about the same current as small power valves. When testing these, short the sockets "S.G." By shorting the sockets "A" and connecting the meter to sockets "S.G." the screen grid current can be measured. This should be about 1 to 2 milliamps.

Amplification Factor

This can be found for any valve by changing the G.B. voltage and noting the change of anode or plate current. Now return the G.B. voltage to the previous figure and change the H.T. voltage so as to produce the same change in anode current as was obtained by modifying the G.B. voltage.

For example : changing G.B. voltage from 3 to 4.5 reduces anode current from 10 to 7 milliamps. With 3 volts G.B., reducing H.T. voltage from 120 to 80 also changes anode current from 10 to 7 milliamps. Ratio of change therefore is 1.5 to 40 —that is, 1 to 27 (approximately). The amplification factor is therefore 27.

The adaptor is used when the valve

(*Continued foot of page* 190)

An original and easily constructed CLOTHES AIRER

EVERY household needs a clothes airer, and where one is non-existent, the simple design illustrated would be very welcome. It departs somewhat from the conventional pattern, and is in some respects an improvement, having quite a good capacity but requiring little timber for its construction. Also, it is remarkably light to carry about. As will be seen from the drawings, it consists of a frame and with side extension rails, the latter being of the pull-out variety.

Framework

A front view is given in Fig. 1, with a side view in Fig. 2. From these the dimensions may be gathered. A piece of ⅞in. deal board will serve for the material. The uprights are ⅞in. by 1½ins., also the nails and feet. Cut the uprights to length and at the distances shown cut the slot and mortises for the joints. Fig 3 shows these joints, a tongued and slotted one at A for the top rail, and a mortise and tenon B for the middle rail.

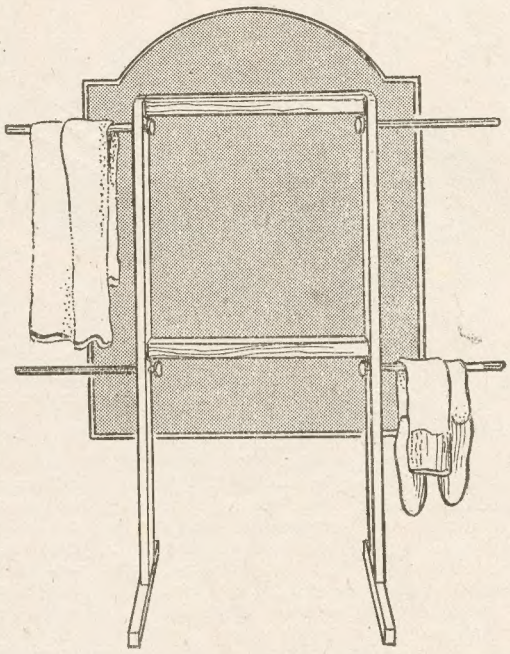
The rails are cut to lengths given, with a surplus of 1in. at each end for the tenons. It will be seen that the uprights are fitted with their narrow sides facing front ; the rails with their wider sides also facing front.

Make the joints neat and close fitting, glue up, and when the glue is set hard bore through the joints with a ¼in. bit. Cut wood pins to fit these holes and glue in. The ends of the pins and surplus of the tenons sticking out should be sawn off and the whole sandpapered smooth.

Feet Joint

The uprights are fitted to the feet with a close cut halved joint, as shown in Fig. 2. See this joint is cut at true right angles to the feet, so that the article stands vertical. Strengthen the joints with two screws to each. For appearance sake the upper corners of the feet might be bevelled off a little.

Now go over the frame with glass- paper, smoothing the surface and rounding off the sharp angles where the clothes pass over. This rounding off of the upper edges of the rails should be well done as sharp edges at these places have the effect of marking the damp clothes.



Pull-out Rails

The pull-out rails are made from lengths of ½in. or ⅜in. round wood rod, the former diameter for preference. Cut them to the length shown at C. The round rod mentioned can be bought at many shops now, but if any difficulty is experienced, it is not a difficult business to plane up strips of wood, cut from the board, to the given diameter.

The strips should firstly be planed to ½in. square, then have their corners planed off to make them octagonal shape. If the sharp angles of the octagon are now planed off, a little work with file and then glass-paper will make them approximately round in section.

Rod Stop

To each rod, at its inner end, a small disc of fretwood, 1in. diameter, should be glued, as a stop. Any scraps of fretwood available can be used up for these. Strike the 1in. circles first, then bore the holes in the centre for the rod. The discs can then be cut out with the fretsaw.

Holes for the rods should be bored through the uprights of the frame at about 1in. below the rails. Smooth these holes on the inside with glass-paper wrapped round a stick, but do not overdo it or the rods will be too loose and tend to drop when drawn out.

The rods can now be pushed through the holes from the inside, one at a time. They should slip through smoothly, and probably will do so if of the machine-made variety. Home made rods, however, not being perfectly true, may stick at parts and in such case the parts where sticking takes place should be marked in pencil and be glasspapered off until a smooth in and out motion is obtained.

This completes the article. It is not usual to paint or varnish such a clothes airer as the heat of the fire might soften the paint and cause it to stick to the clothes, so leave it in the plain wood.

A length of ⅞in. planed deal board, 4ft. 2ins. long, and 6½ins. wide, will provide enough timber to make the complete article, except the rods. For the latter 5ft. of dowel rod will be ample, or they can be planed up from waste left over from the board after cutting the pieces of the frame.

It may be added, that when using the airer it is advisable to balance it by using both extending side rails at once. If only one pair of the rails is used the whole article may overbalance one side, especially if the clothes are heavy. The best plan is to use the rails of the frame for any heavy things and the side rails for the lighter ones.

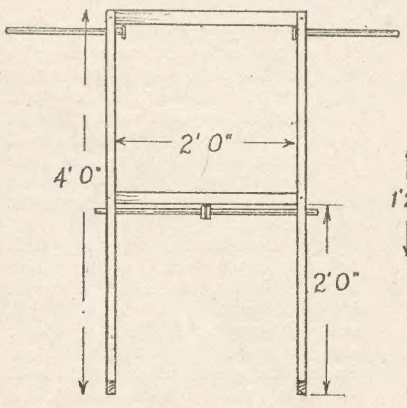


Fig. 1—Front view showing parts

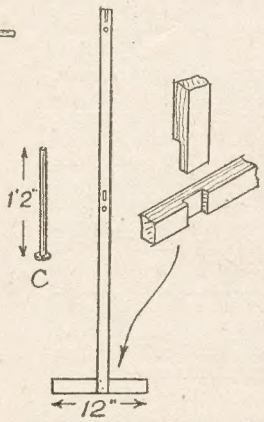


Fig. 2—Side view and foot joint

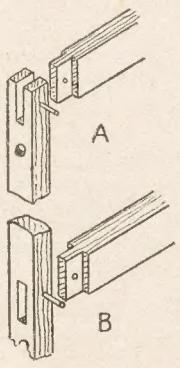


Fig. 3 Rail joints

Three useful articles to be made by the worker interested in LEATHER WORK

THERE are, no doubt, a number of our readers who have tried their hands and skill at leather-work. This is an art requiring patience and adaptability, as so much depends upon the actual handling of the various tools and the transferring of the design to the leather.

We are giving here suggestions for three simple pieces of work, all easy to make up, providing one knows how to hammer and work the decoration into the leather. Even for those who have not this skill, and would perhaps wish to choose something in design even more simple than that given here, the pieces would look very effective if made of plain leather.

In the illustration (Fig. 1) is shown the three articles suitable for laying

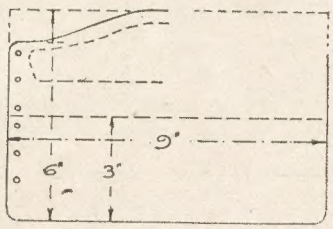


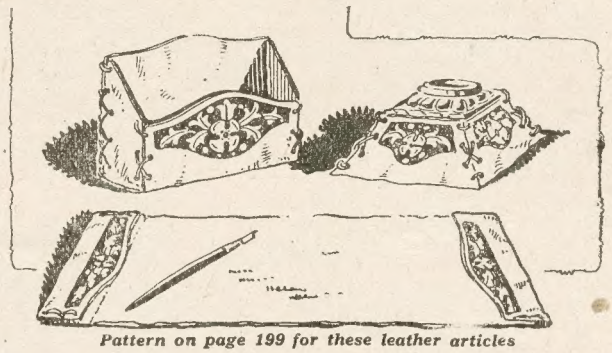
Fig. 2—The blotter end

on the writing desk or table. The blotting pad is made so a large pad of blotting paper may be slipped into it without the trouble of tucking it under the corners which is generally done in the ordinary blotter. It is simply one long piece of leather lined with moiré or other such suitable lining of a colour that would match the leather or form a pleasing contrast to it.

For economy sake, instead of one large piece of leather as suggested, which, after all is a good deal mostly hidden from view, the ends only might consist of leather, with, perhaps, a stout card or canvas middle portion fixed to it. In Fig. 2 a convenient size is given for one of the ends, a piece of leather 9ins. by 6ins. being shown which doubles across the centre, and one half is shaped and is to be decorated on the underside according to the dotted lines and the full-size pattern at A given on page 3 of the cover of this issue.

The thonging together of the two parts when folded over can be understood from the six holes at each end, and the thonging material may consist of strip leather or the new plastic lacing.

The design can be transferred to the leather by means of carbon paper and a bluff-pointed hard-wood "pencil" or piece of rod. The shaded portion of the work shown is set down and the edging to the design set up with the various tools used for leather working.



Pattern on page 199 for these leather articles

A book on this fascinating work, we suggest, should be purchased by the worker, all necessary details regarding the various kinds of tools used and the method of working them would then be made plain. The desk set here planned should be of leather of warm biscuit colour with the relief design carried out on the smooth side, of course.

The second of our leather-made articles is a stationery or letter holder. This is made from one piece of leather measuring 15ins. by 10ins. and trimmed and cut to the outline given in Fig. 3. Note the holes for the thonging, these being made with the special steel punch, the leather resting on a thick sheet of lead or hardwood while the hammering is being done.

On the pattern sheet at B, the full-size decorated panel is given and this again is transferred to the leather as previously suggested and tooled in.

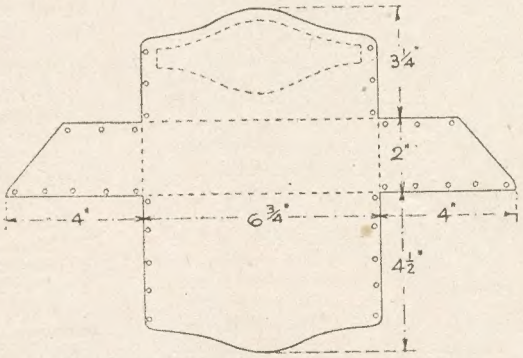


Fig. 3—Outline shape of the letter holder

A lining material is again added to the holder and stitched in neatly, the edges of the leather being pasted down and hammered over the lining.

Our third leather article is an ink bottle stand of rather unusual shape and artistic finish. In Fig. 4 the details are given for cutting out the leather, and for it a piece measuring 9¼ins. square will be required. A little extra care will have to be exercised in drawing out the outline, but once one side section has been outlined, which is attached to the simple 5in. sided square, then a tracing may be made of this and repeated all round.

The four panels of decoration are worked in a similar manner to the last. Two distinct outlines are given of these, as in transferring the patterns to the leather, the paper will become ragged, no doubt. One pattern for each pair, therefore, should thus be helpful.

A rather large inkwell space has been suggested here, and when the four sides of the leather case have been brought up and laced with the thonging, the section taken will look like that in the enlarged circled cross section in Fig. 4. For a smaller inkwell it would hardly be possible to have the upturned flaps decorated, as the panels would thus be proportionately smaller.

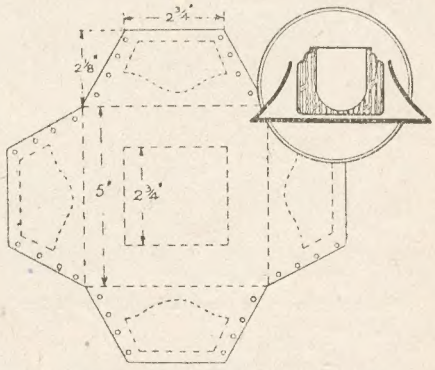


Fig. 4—Detail and section of ink well holder

The same idea regarding the actual shaping of the original leather, however, would be carried out. No inside lining material will be needed for this inkwell cover.

The fancy leather or similar material from which the parts are cut is usually obtainable from art and craft shops, although any particular colour or type may be impossible just when you want it.

There are many points to remember in undertaking

SNOW PHOTOGRAPHY

IN the issue of Hobbies Weekly for 15th September there appeared the first of our series of "What to Take" articles. It dealt with Landscapes and, in the opinion of the author, September is one of the best months of the year for such subjects. With this thought in mind it is natural that the second subject should be one with a winter background.

At this period of the year our opportunities for camera work are very limited owing to the generally poor light and the few prevailing hours of actual full daylight. These conditions, unfortunately, are responsible for many cameras being put away and forgotten, with the result that only a very small percentage of exposures are made compared with the large number made during the summer and holiday months.

A Better Chance

The enthusiastic amateur will do well to make a special note of this fact. First, because he or she is in a much better position to get a supply of films, as the dealers have fewer demands for them. Secondly, although the times are limited when photography can be practised, yet on those occasions many choice subjects are available and some excellent results can be obtained.

Just for a moment take your mind back to the article on Landscapes and try to imagine the beauty of many types of trees when they are without

Note the general scene of this "Winter's Day" Picture

leaves or nearly so. You will be surprised how a landscape under such conditions, especially if the trees happen to be full grown elms with their delightful filigree patterns formed by the twigs, will give a beautiful pictorial result.

Of course lighting has to be carefully studied before making an exposure and it certainly pays to have patience. If necessary, wait several minutes for the sun to play its part in the making of your picture. A splash of December or January sunshine on the trunks of the trees in the local wood or park will well repay any effort. It should give you something that will assuredly be outstanding in the local competition or exhibition next season. It may well prove the only one of its type and so have a note of originality.

Snow Pictures

Snowstorms are not common in this island of ours and when they do happen most of us are too much occupied with other pursuits to be able to put on our heavy shoes and leggings and go for a tramp into the places where snow pictures are available. No doubt you have had the opportunity of seeing quite a number of snow pictures, but are they really pictures or just merely records ?

Frankly, very few attain the standard of pictorial art, for snow requires other items to be introduced before it can become the background of a picture. The chief of these other items is, of course, sunshine. With the sun playing on your snowscene shadows will present themselves and with shadows we get a range of half-tones. There will be patches of snow reflecting the sunlight and giving life to what otherwise is just a white mass.

It is these "extras" which alone can be responsible for breaking up the heavy contrasts which obviously must prevail in the photograph if the exposure has been made before the sun appeared. Those who have followed these photographic articles know well enough that results without half-tones are too contrasty to be pictorial.

Prepare for Opportunity

Do not, however, let this deter you from trying to get some sort of winter picture. Be in the open where you think there may be a picture or two about 12 o'clock. Note the sky, and if there is an indication that a break in the clouds is likely to occur get the camera in position with shutter set ready for the exposure to be made. Usually the break is only for a very few seconds and you must not lose it.

Tree Frost Effect

It may happen that hoar frost is still present. This certainly can help to give you a chance of one or two exposures. Note its effect on the bushes, small twigs of certain trees and possibly on an unbroken spider's web. If there is a pond or river bank on your tramp it will possibly help you to find something suitable for a shot—especially if there is any growth, such as reeds, on the bank. For with snow, frost, water and bushes you have the components to hand, if the light is right, for the making of a picture.

A few years ago the author was staying in the country during January.

A beautiful picture of the Woods in Winter

On several nights there was a slight fall of snow, but not enough to make a heavy layer. The effect was rather pleasing, however, for in the woods there were high banks. The snow was only sprinkled, leaving patches of autumn leaves and the roots of the bushes showing, and the combination of these and the snow made the scene very charming. Unfortunately, the sun would not shine those days and pictures did not materialise.

A Matter of Figures

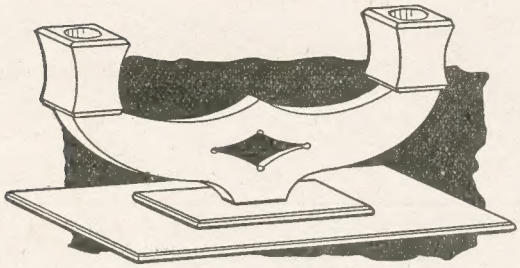
Would you include a figure or figures in a snowscene ? This is a question sometimes put when a discussion on "What-to-Take" is under way. It is one that can only find a satisfactory answer when all details are known. If the scene is something in the nature of a landscape, including a farm-house or a cottage, and it is possible to persuade a friend to pose as an old man with a bundle of faggots on his back, then use him as your model. But in the ordinary way the scene is likely to be just as good without any figure in it. It must be remembered that very few persons care to wander about the countryside during a snowstorm, therefore the inclusion in a shot is rather out of place.

The question of exposure is one that cannot be ignored. Probably it is more difficult to gauge it correctly

(*Continued foot of page* 195

A delightful and reasonably simple to make

PLASTIC CANDLESTICK



A handsome piece for the table centre

A DELIGHTFUL way to set off the evening meal table is to use a pair candlestick such as the item shown here. Whether the candles are lit or not, it forms a charming piece and makes a most presentable gift. Transparent or opaque Perspex looks equally well. A particularly striking effect can also be achieved by making the whole of the item in black Perspex, with the exception of the plinth, which may be in one or other of the pastel shades.

Base and Plinth

The drawing at Fig. 1 shows the details. The base and plinth are each cut from $\frac{1}{4}$in. thick Perspex and both have the top corners bevelled. Cut out the parts, then plane the edges smooth. The bevels are also worked with the plane, after which the surfaces are smoothed with flour-grade glasspaper and polished.

The plinth is mortised to take a tenon formed in the support piece. The aperture is cut most conveniently by drilling a small hole in each two diagonally opposite corners, then cutting along the sides with a fretsaw. Trim the aperture with a medium grade file and put the plinth on one side.

Support

The support piece is made in $\frac{1}{2}$in. thick material, but where this is not available, two pieces each $\frac{1}{4}$in. thick are cemented face to face. In this event it is wise to choose opaque material as it is difficult to cement relatively large pieces face to face without air bubbles becoming trapped in the cement. If transparent material has been used, these bubbles will, of course, be only too apparent.

To cement the two parts together coat one face of each part with cement, making sure that all the surface has been covered and working quickly so that the cement does not harden before you are ready. Press the two pieces together and immediately clamp them between two flat boards. Screw the clamps tight and put on one side for several hours to make sure that the cement has completely set right through the "sandwich".

Cardboard Template

In the meantime a cardboard template is prepared using the grid lines shown in Fig. 1 and "plotting" the shape out full size. Cut out carefully, and do not forget to include the tenon at the bottom. When the support material has thoroughly dried, take off the clamps and plane one edge straight and square.

Lay the template on the material with the tops of the "wings" level with the trued edge. Mark in the shape with a sharp scriber and also mark the face of the template in some way. Next square lines across the trued edge of the Perspex and lay the template on the opposite side of the material.

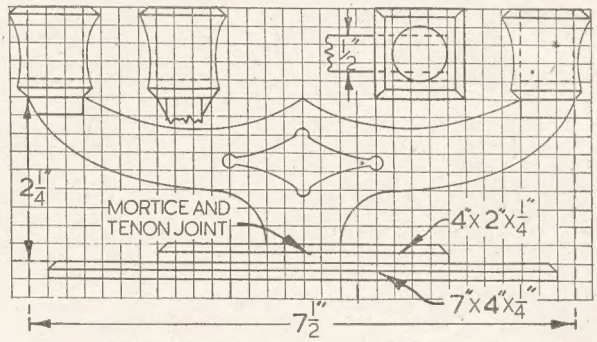
This time the marked face goes against the Perspex and the squared lines locate the position required. In this way you avoid any slight inaccuracy in the curves which is not enough to spoil the line of the support, but which if transferred from one side to the other might put the edge out of square.

Cut the outer profiles first, then trim, smooth and polish the edges. Bore the four holes in the centre and saw out the aperture. Trim these edges as far as possible with a file. The "narrow" parts are then smoothed with a piece of glasspaper folded in halves. The edges of the aperture are then polished. The support can now be cemented into the plinth, which is in turn cemented to the base.

Candle Sockets

Each of the two candle sockets is made from five pieces of $\frac{1}{4}$in. thick Perspex. Eight of these pieces have a $\frac{3}{4}$in. diameter hole cut in them, whilst the remaining two are left plain. The next step is to take a piece of $\frac{3}{8}$in. dowel rod, $\frac{7}{8}$in. long, and wrap a strip of paper round it until it fits easily into the $\frac{3}{4}$in. holes. It must be an easy fit, neither too loose nor too tight.

Now take four of the parts with the holes in them and cement them face to face to make a 1in. square block. This is done by slipping them over the paper-covered dowel, squaring up the edges and then cramping the "sandwich" between two pieces of wood. When the cement has dried, the dowel can be pulled out and the paper cleaned away.



Profile of candlestick and parts in $\frac{1}{4}$in. squares

The bottom piece of Perspex is now cemented in place. The second candle socket is made up in the same way.

The best way to shape the sockets is with flat, half-round files and glasspaper. A small cardboard template is required to check the shaping of the curves. Cement the sockets in position then cut the four triangular shaped slips and cement these in the corners between the underside of the sockets and the sides of the support.

All that now remains to be done is to slip the candles in their sockets and the item is ready for use.

Those who followed our earlier instruction on plastic work will easily be able to complete an attractive and useful article for the home.

Snow Photography—(*Continued from page 194*)

for snow pictures than for any other subject. It follows, therefore, that wherever possible a reliable exposure meter is the best guide. Whatever type you are in the habit of using stick to it for this work. Your experience has proved it to be good and there is no reason why it should let you down for such a subject.

It is very easy to over-expose because of the strong light given off by the snow. At the same time nothing can be gained by under exposing. So the nearer one gets to correct exposure and correct developing the nearer you are to getting not only a perfect negative but also the means of a perfect picture.

Working in millimetres is simple to convert with these TABULATED DECIMALS

SOMETIMES a piece of paper, card, film, mica, or sheet metal, is stated to be .0156in. or 0.397 m/m thick. Have you any idea of the thickness indicated by these figures? If you know nothing about decimals of an inch, or the equivalent in millimetres, the combinations of figures will be a complete mystery to you.

When it comes to common fractions of an inch, however, everybody has a good idea of the thicknesses, as an inch is merely split up to have 2, 4, 8, 16, 32 and 64 divisions. Each division is called, respectively, a half, quarter, eighth, sixteenth, thirty-second and sixty-fourth.

Now, if we like, we can split the 64 divisions in half, this making 128 divisions in the inch. If we do so, however, there is scarcely space for the individual lines. The limit, as a result, is usually confined to 64 divisions. On an ordinary rule, the limit is 16 divisions to each inch. To get our 64 divisions, we mentally halve each of the 16 divisions, and by halving the 32 divisions thus obtained, we get our 64 divisions.

As we find, there is a limit to this dividing. It is not too easy to put 64 equal-spaced lines within an inch. It is worse if we try to introduce 128 divisional lines in the space of an inch. The lines would have to be very fine—like hairs. By doubling the 128 divisions, thereby making 256 divisions, lines would need to be super-fine, otherwise the space in the inch would be completely filled up with divisional lines—one black margin, in fact. We have, indeed, gone over the limit.

Equivalents of Fractions of an Inch

For purposes of comparison, we will iconfine ourselves to the normal fractions of an inch—the 64 divisions. The equivalent of 1/64in. (one of the 64 divisions) in decimals of an inch is .0156in. The equivalent in millimetres is 0.397 m/m. By going back to the beginning of this article, it will now be realized that the thickness indicated by the mysterious groups of figures is in each case, 1/64in.

Much easier by knowing the equivalent decimals of an inch, or millimetres, by the fractions of an inch. We will not, therefore, go into detail concerning decimal and millimetre markings. Instead, we will give you the fractions of an inch, with their equivalent decimal and millimetre groups of figures.

If, consequently, at some future date, somebody states that the material to be used is .9844in. long, by .0375in. wide, by .1250in. thick, you will know the stuff measures 63/64in. by 15/16in. by ⅛in. The same measurements apply if the size is stated to be 25.003 m/m by 23.812 m/m by 3.175 m/m.

You will know all this because of the handy reference chart which is printed below.

It will be seen that two columns separate the fractions in an inch. This is intended to facilitate reference, there being 32 fractions in each half, and 64 altogether. There is of course, no need for the inclusion of the 128 fractions.

The latter are "between" fractions and it is doubtful if you will ever need to decide on the thickness of a piece of wood, card, etc., or the width and thickness, by means of them. In the case of decimals of an inch, it is a good idea to remember that there are 1.0000 in an inch.

If we halve that figure, we get .5000 in half of an inch, with .2500 in a quarter of an inch and .1250 in an eighth of an inch, and .0625 in a sixteenth of an inch, and finally, .0313 in a thirty-second of an inch, and .0156 in a sixth-fourth of an inch.

FRACTIONS, DECIMALS AND MILLIMETRES

1/64in.	=	.0156in.	or 0.397 m/m.	33/64in.	=	.5156in.	or 13.079 m/m.
1/32in.	=	.0313in.	„ 0.794 m/m.	17/32in.	=	.5313in.	„ 13.494 m/m.
3/64in.	=	.0469in.	„ 1.191 m/m.	35/64in.	=	.5469in.	„ 13.891 m/m.
1/16in.	=	.0625in.	„ 1.588 m/m.	9/16in.	=	.5625in.	„ 14.287 m/m.
5/64in.	=	.0781in.	„ 1.985 m/m.	37/64in.	=	.5781in.	„ 14.684 m/m.
3/32in.	=	.0938in.	„ 2.381 m/m.	19/32in.	=	.5938in.	„ 15.081 m/m.
7/64in.	=	.1094in.	„ 2.778 m/m.	39/64in.	=	.6094in.	„ 15.478 m/m.
1/8in.	=	.1250in.	„ 3.175 m/m.	5/8in.	=	.6250in.	„ 15.875 m/m.
9/64in.	=	.1406in.	„ 3.572 m/m.	41/64in.	=	.6406in.	„ 16.272 m/m.
5/32in.	=	.1563in.	„ 3.969 m/m.	21/32in.	=	.6563in.	„ 16.688 m/m.
11/64in.	=	.1719in.	„ 4.366 m/m.	43/64in.	=	.6719in.	„ 17.085 m/m.
3/16in.	=	.1875in.	„ 4.762 m/m.	11/16in.	=	.6875in.	„ 17.462 m/m.
13/64in.	=	.2031in.	„ 5.159 m/m.	45/64in.	=	.7031in.	„ 17.859 m/m.
7/32in.	=	.2188in.	„ 5.556 m/m.	23/32in.	=	.7188in.	„ 18.256 m/m.
15/64in.	=	.2344in.	„ 5.953 m/m.	47/64in.	=	.7344in.	„ 18.653 m/m.
1/4in.	=	.2500in.	„ 6.350 m/m.	3/4in.	=	.7500in.	„ 19.050 m/m.
17/64in.	=	.2656in.	„ 6.747 m/m.	49/64in.	=	.7656in.	„ 19.447 m/m.
9/32in.	=	.2813in.	„ 7.144 m/m.	25/32in.	=	.7813in.	„ 19.843 m/m.
19/64in.	=	.2969in.	„ 7.541 m/m.	51/64in.	=	.7969in.	„ 20.240 m/m.
5/16in.	=	.3135in.	„ 7.937 m/m.	13/16in.	=	.8125in.	„ 20.637 m/m.
21/64in.	=	.3281in.	„ 8.334 m/m.	53/64in.	=	.8281in.	„ 21.034 m/m.
11/32in.	=	.3438in.	„ 8.731 m/m.	27/32in.	=	.8438in.	„ 21.430 m/m.
23/64in.	=	.3594in.	„ 9.128 m/m.	55/64in.	=	.8594in.	„ 21.827 m/m.
3/8in.	=	.3750in.	„ 9.525 m/m.	7/8in.	=	.8750in.	„ 22.224 m/m.
25/16in.	=	.3906in.	„ 9.922 m/m.	57/64in.	=	.8906in.	„ 22.621 m/m.
13/32in.	=	.4063in.	„ 10.922 m/m.	29/32in.	=	.9063in.	„ 23.018 m/m.
27/64in.	=	.4219in.	„ 10.716 m/m.	59/64in.	=	.9219in.	„ 23.415 m/m.
7/16in.	=	.4375in.	„ 11.120 m/m.	15/16in.	=	.9375in.	„ 23.812 m/m.
29/64in.	=	.4531in.	„ 11.509 m/m.	61/64in.	=	.9531in.	„ 24.209 m/m.
15/32in.	=	.4788in.	„ 11.906 m/m.	31/32in.	=	.9688in.	„ 24.606 m/m.
31/64in.	=	.4844in.	„ 12.303 m/m.	63/64in.	=	.9844in.	„ 25.003 m/m.
1/2in.	=	.5000in.	„ 12.700 m/m.	1in.	=	1.0000in.	„ 25.400 m/m.

Model Signals—(*Continued from page 197*)

through where shown to take the pivot wire and operating wire respectively. The pivot is threaded through the hole in the arm and taken once round its width before being finally squeezed flat to grip tightly. The operating wire is bent into a tiny square-shaped hook at each end and after being cut to the required length to reach from the arm to the counter-balance weight at the bottom of the post.

After pushing the semaphore arm pivot through the hole in the post, the pivot wire is carefully bent to a right-angle on the back of the post to retain the arm in place. The arm must work quite freely for the signal to be a success.

The counterweight and its arm may be made from wood or metal, but the latter material will be found more satisfactory, as the drilling of very small holes in thin wood of such small size is not a success. The weight may be a "real" weight composed of two appropriately - sized brass washers, soldered or stuck to the arm. If this weight is not sufficient to return the semaphore arm to "danger", then a fine rubber band stretched between the "weight" and the baseboard of the railway will assist matters.

The dummy lamp may be made from a short length of ¼in. dowel-rod fixed with a pin to the post behind the arm.

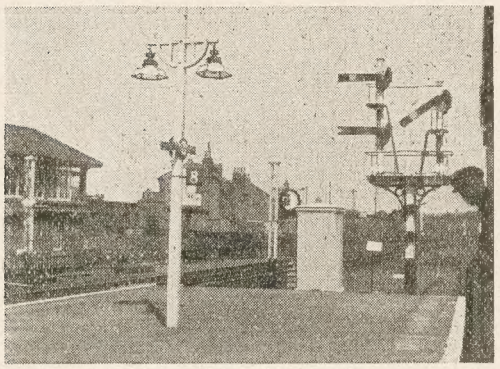
After the whole assembly is fixed in place, the signal should be operated by moving the counterweight arm, and a stop-pin should be put into the post above and below the weight-arm to limit its movement to that required to move the semaphore from a fraction above horizontal (danger—"on") to an angle of about 40 degrees with the post (all-right—"off"). Stops should *not* be fitted to the semaphore arm itself.

The signal diagram shown is full-size for "O" gauge, i.e. 7 millimetres (about ¼in.) to the foot full-sized railway practice. (Every ¼in. on an "O" gauge model railway equals one foot on the real railway.)

(*To be continued*)

This article in our series of Miniature Railways deals with

MODEL SIGNALS



A set of Junction Signals

NO model railway, however humble, can be called complete without one or two signals. Even though there are many people who imagine that they are just a decoration, and have no real place on the smaller model line. In point of fact, signals are much more than mere items of scenery past which a model train runs, and if a few "Homes" and "Distants" are made up, they may be placed at positions on the layout where they can actually carry out definite signalling duties.

If the reader already has two or three signals of the cheaper "tin-plate" variety handy in his possession, here is a method of slightly altering them so they do not look too reminiscent of a row of lamp-posts.

Each signal, in itself may look quite passable, but on a layout, signals of a uniform height are apt to look very "toyish" and unreal ; and in fact most "unrailwaylike".

Converting to Realism

Now to the conversion. First scrape away the paint from the joint between the post and its base, and carefully unsolder them apart. Then remove the counter-balance weight by cutting off the flat end of the pin upon which the counter-weight arm pivots ; also detaching the operating wire in a similar way.

The inner surface of the bottom end of the hollow tinplate post (where unsoldered from the base-plate) is now cleaned out with a small file, and a squared-up piece of hard-wood about 6ins. long is forced into place. This will have the effect of lengthening the post by about 3ins.

The counter-balance weight is now re-pivoted into the wooden portion of the post, a new and longer operating wire fitted, and the whole composite post painted white with the exception of about 2ins. at the ower end, which should be black.

A small block of hard-wood about 2½ins. square, with a square hole in its centre to receive the post, must now be made to form a new base-plate.

If the original signal was fitted with a ladder, this may be lengthened by soldering another length of ladder taken from another signal which may be unserviceable.

In a similar way two single signals may be cut down and mounted in square holes cut at either end of a piece of hardwood to produce a junction or "splitting" signal. In this case, if the signal is being made for a definite junction on the layout, care should be taken to see that the "branch" line is covered by the lower arm and the "main" (or "straight ahead run") is signalled by the higher arm of the pair.

Split Signals

If both roads ahead of the junction are of equal importance, then both arms on the splitting signal should be made of equal height. When being operated, both arms of a pair of junction signals should never be "off" (i.e. "down") at the same time, but should be lowered in accordance with the direction in which the junction points are set.

The picture shows such a junction signal on the Southern region in which the road is set for the driver to proceed on to the branch-line, which is to the right. The "main" goes on straight ahead, and is signalled by the higher arm on the post. The lower arm on the left-hand post is a distant arm, with its end cut into a "fish-tail" and painted yellow, with a black "V"-shaped bar.

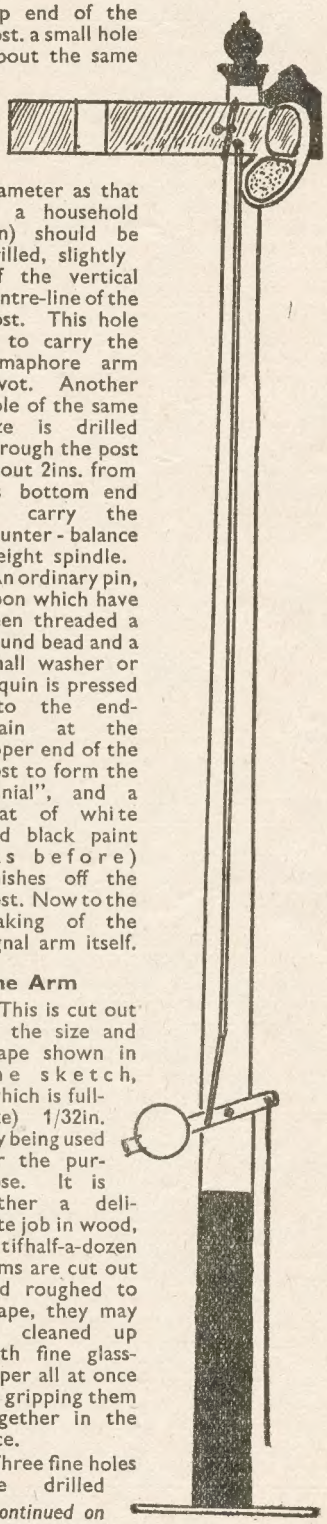
The actual construction of signals suitable for an "O" gauge railway is not very difficult, and may be under-taken in wood or metal, as desired. If wood is chosen, naturally the finished articles will by no means be so strong, but if carefully made and used, they will be found quite satisfactory.

Dimensions

For an average signal post (27ft. high in prototype) a 7½in. length of 9/32in. hardwood will be required, this being tapered down on all four sides to 9/64in. at one end, from 9/32in. at the other. This tapering need not be done unless desired, but it has a very subtle influence on the "look" of the finished signal.

At a distance of 9/32in. from the top end of the post. a small hole (about the same diameter as that of a household pin) should be drilled, slightly off the vertical centre-line of the post. This hole is to carry the semaphore arm pivot. Another hole of the same size is drilled through the post about 2ins. from its bottom end to carry the counter - balance weight spindle.

An ordinary pin, upon which have been threaded a round bead and a small washer or sequin is pressed into the end-grain at the upper end of the post to form the "finial", and a coat of white and black paint (as before) finishes off the post. Now to the making of the signal arm itself.



The Arm

This is cut out to the size and shape shown in the sketch, (which is full-size) 1/32in. ply being used for the pur-pose. It is rather a deli-cate job in wood, butifhalf-a-dozen arms are cut out and roughed to shape, they may be cleaned up with fine glass-paper all at once by gripping them together in the vice.

Three fine holes are drilled

(*Continued on page 196*)

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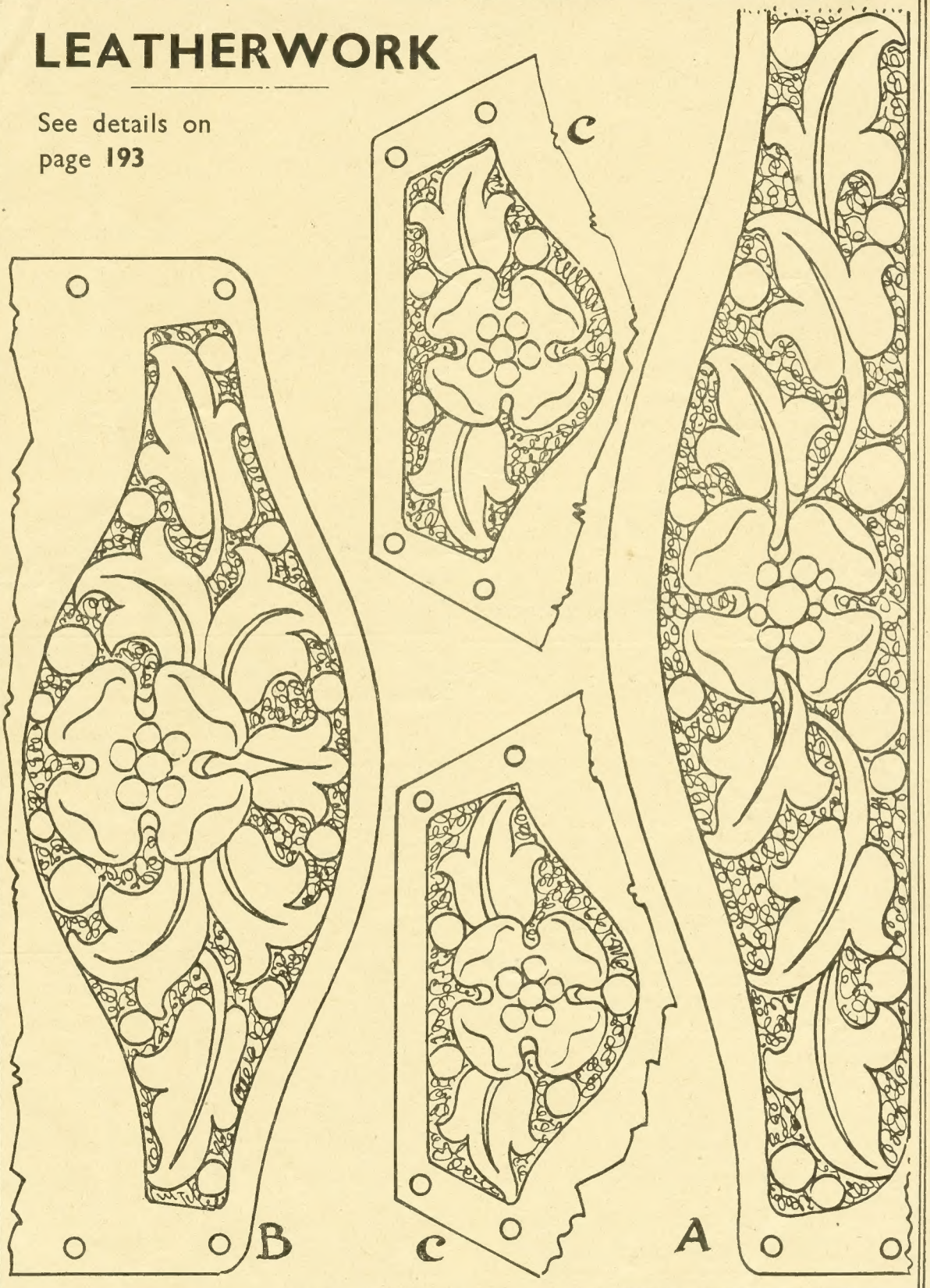
LEATHERWORK

See details on page **193**



Printed by BALDING & MANSELL, LTD., London and Wisbech, and Published for the Proprietors, HOBBIES LTD., by HORACE MARSHALL & SON, LTD., Temple House, Tallis Street, E.C.4. Sole Agents for Australia and New Zealand : Gordon & Gotch (A'sia) Ltd. For South Africa : Central News Agency Ltd. Registered for transmission by Canadian Magazine Post.